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ABSTRACT

This document compiles information about 13 comprehensive mathematics curriculum programs that were developed specifically to address the recommendations of the National Council of Teachers of Mathematics' (NCTM) Curriculum and Evaluation Standards for School Mathematics. Three of the programs are elementary programs, five are for middle school, and five are geared towards high school. All of these programs were developed with support from the National Science Foundation (NSF). Each description includes a summary of the program, publisher contact, developer/implementation center, students materials, teacher materials, other support materials, current availability of curriculum materials, impact data compiled to date, and web sites. Programs include: (1) Everyday Mathematics; (2) Investigations in Number, Data, and Space; (3) Math Trailblazers; (4) Connected Mathematics; (5) Mathematics in Context; (6) MathScape: Seeing and Thinking Mathematically; (7) MATHThematics; (8) Middle-school Mathematics through Applications; (9) Contemporary Mathematics in Context; (10) Interactive Mathematics Program (IMP); (11) MATH Connections: A Secondary Mathematics Core Curriculum; (12) Mathematics: Modeling Our World (ARISE); and (13) SIMMS Integrated Mathematics. (ASK)

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# ***CURRICULUM SUMMARIES***

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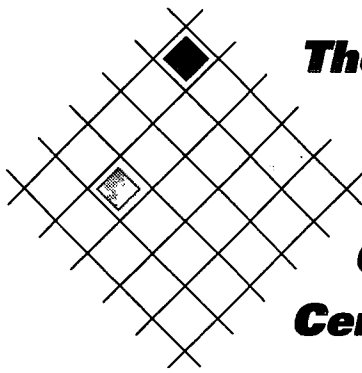
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## **The K-12 Mathematics Curriculum Center**

**Second Edition  
January 1999**

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**The**  
*K-12*  
**Mathematics**  
**Curriculum**  
**Center**

# CURRICULUM SUMMARIES

**Second edition**  
**January 1999**

**EDC**



## About This Publication

*Curriculum Summaries* compiles information about 13 comprehensive mathematics curriculum programs that were developed specifically to address the recommendations of the National Council of Teachers of Mathematics' *Curriculum and Evaluation Standards for School Mathematics*. Three of the programs described here are elementary programs; five are for middle school; five are for high school. All of these programs were developed with support from the National Science Foundation. Many of them are newly available as complete and published curricula. Part of our mission at the K–12 Mathematics Curriculum Center (K–12 MCC), and the intention of this document, is to support teachers, schools, and districts in learning about these new programs and in considering their use.

This publication is intended to be a source of basic information about the mathematics programs it describes. We have included information that we think will help the reader understand the basic tenets of each of the programs, what distinguishes them from traditional curricula, and what distinguishes them from one another. We have also included information that we hope will help you learn more about these programs, through contact with the publishers, developers, or implementation centers; through print materials and web sites; or through continued contact with the K–12 MCC.

We have tried to describe the programs as the developers and publishers would represent them. The information about each of the curriculum programs was obtained from the materials themselves and was checked by representatives of each of the programs for accuracy. *Curriculum Summaries* is not, therefore, a source of evaluative data or critical analyses of these programs.

The information included in this document is as accurate as we could make it at the time of publication. However, since we have included contact information, availability information, and other information that may change over time, we will update the summaries regularly to provide the most accurate information. For future updates of this publication, contact the K–12 Mathematics Curriculum Center.

*Second edition, January 1999.*

*Cover design by Emily Passman.*

*Design and Layout by Kristin Winkler.*

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## **About the K–12 Mathematics Curriculum Center**

Established in 1997 by Education Development Center, Inc., the K–12 Mathematics Curriculum Center (K–12 MCC) supports school districts as they build effective mathematics education programs using curricula that respond to and align with the National Council of Teachers of Mathematics' *Curriculum and Evaluation Standards for School Mathematics*. The K–12 MCC receives support from the National Science Foundation (NSF) and works with the three NSF-funded grade-level mathematics implementation centers (see next page).

The K–12 Mathematics Curriculum Center offers a variety of products and services to assist district leadership teams with curriculum selection and implementation. From 1998 through 2000, we will offer a series of three seminars repeatedly nationwide; the seminars address the selection and implementation of new curricula, professional development for successful implementation, and leadership for curriculum change.

Additionally, the K–12 MCC provides many print resources, including these *Curriculum Summaries*; a collection of *Curriculum Perspectives* from teachers and administrators who have used the 13 reform curricula; *Choosing a Standards-Based Mathematics Curriculum*, a guide that suggests a process for selecting and implementing curricula and describes how these reform curricula differ from traditional materials; a series of short *Issues Papers* that explore contemporary issues in mathematics education; *Discussion Cases* and facilitator guides which parallel the topics of the seminars; *Curriculum Connections*, a newsletter produced three times annually which provides curriculum and resource updates, feature articles, and upcoming seminar information; and a *Curriculum Reader*, which compiles literature pertaining to the consideration of reform mathematics programs.

Another offering of the K–12 MCC is our web site (<http://www.edc.org/mcc>), which contains up-to-date information about the Center, the 13 curriculum programs, upcoming events, and resources; and links to other useful sites.

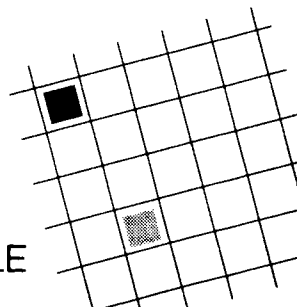
The K–12 Mathematics Curriculum Center will also assist district administrators and teachers as they consider curricula by making referrals to resources, materials, and other educators who have experienced the selection and implementation process.

For more information about any of our materials and services, or to receive a brochure or seminar information, please feel free to contact us:

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## **National Grade-Level Implementation Centers**

### **Alternatives for Rebuilding Curricula (ARC)**

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<http://www.comap.com/arc>

The ARC Center is a collaboration between the Consortium for Mathematics and Its Applications (COMAP) and the three NSF-supported elementary mathematics curriculum projects, *Investigations in Number, Data and Space* (TERC); *Math Trailblazers* (University of Illinois at Chicago); and *Everyday Mathematics* (University of Chicago). The aim of the collaboration is to promote the wide-scale and effective implementation of reform elementary mathematics curricula.

### **Show-Me Center (National Center for Standards-based Middle Grades Mathematics Curricula)**

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<http://showmecenter.missouri.edu/>

The Show-Me Center, in partnership with five NSF-sponsored middle grades curriculum development satellites (University of Wisconsin, Michigan State University, University of Montana, Institute for Research on Learning, Education Development Center) and their publishers, provides information and resources needed to support selection and implementation of standards-based middle grades mathematics curricula.

### **COMPASS (Curricular Options in Mathematics Programs for All Secondary Students)**

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<http://www.ithaca.edu/compass>

COMPASS is a secondary school implementation project funded in part by the National Science Foundation. The COMPASS implementation center partners with a satellite site for each of the five secondary-level curricula.

The COMPASS project informs schools, districts, teachers, parents, administrators, state offices, and other groups about these innovative curricula; aids in the first general phases of implementation; and coordinates requests for additional information and assistance from the satellite sites. Each satellite provides additional information about its curriculum to these same constituencies as well as professional development opportunities for schools interested in adopting its curriculum.

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# EVERYDAY MATHEMATICS™

An elementary school curriculum for grades K–6, developed by the University of Chicago School Mathematics Project

*Everyday Mathematics* is a K–6 curriculum intended to enrich the mathematical experiences of teachers and children. It builds on fundamental mathematical strands such as numeration and order, measures and measurement, reference frames, operations, patterns, functions, and sequences. It uses more of the mathematical spectrum by exploring data and chance, geometry and spatial sense, and algebra and the uses of variables.

The curriculum integrates mathematics into other subject areas; mathematics becomes part of ongoing classroom routines, outdoor play, and the transitional moments that occur every day. Teachers use *Everyday Mathematics* as a core curriculum during class time. They incorporate mathematical ideas and routines throughout the school day and encourage the children to continue the routines at home with their families.

The *Everyday Mathematics* curriculum incorporates the belief that people rarely learn new concepts or skills the first time they experience them, but fully understand them only after repeated exposures. Students in the program study important concepts over consecutive years; each grade level builds on and extends conceptual understanding.

The instructional model blends exposition and discussion, individual and group work, projects, explorations, and investigations. In each grade level of the program, students experience hands-on, student-centered, small-group activities which introduce them to various mathematics concepts. Children also learn and practice basic facts throughout the curriculum, in the context of problem solving, choral drills, and a variety of games.

The program includes cross-curricular projects that let children apply mathematics in other subject areas. In grades 4 and 5, children participate in the year-long World Tour and American Tour projects, in which students apply mathematical concepts to learning about the United States and other countries.

Calculators are an integral part of the program as an aid to concept development and applications. The curriculum assumes that each child has a slate, calculator, measuring tools, and drawing tools, and that each teacher has a classroom set of manipulatives.

Every student in grades 1–6 uses two consumable journals throughout the school year to record mathematical ideas and responses to activities and problems. In grades 1–3, students also have a consumable Activity Book. At grades 4 and 5, student materials include the non-consumable World Tour Guidebook (4th) and the American Tour Almanac (5th). At grade 6, student materials include the non-consumable Student Reference Book. Grades 5 and 6 use the Geometry Template for drawing and measuring geometric figures.

Each grade level of *Everyday Mathematics* has a Teacher Resource Package that contains a Teacher's Manual and Lesson Guide, Resource Book (with all blackline masters), a Teacher's Reference Manual, Towards a Balanced Assessment, and other teacher support items.

## Publisher Contact

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## Student Materials

- ◆ Journals (Grades 1, 2, 3, 4, 5 and 6)
- ◆ Activity Books (Grades K, 1, 2, 3)
- ◆ World Tour Guidebook (Grade 4)
- ◆ American Tour Almanac (Grade 5)
- ◆ Student Reference Book (Grade 6)
- ◆ Geometry Template (Grades 5 and 6)
- ◆ All student materials available in Spanish (Grades 1, 2, 3, 4, 5 and 6)
- ◆ *Skills Link*, cumulative practice sets (Grades 1–6)
- ◆ *Home Links* and *Math Boxes*, consumable student versions of blackline masters (Grades 1–3)

## Teacher Materials

- ◆ Teacher Resource Package (K)
  - Program Guide and Activity Masters
  - Home Links 1, 2, 3
  - Teacher's Activity Guide
  - Minute Math
  - Class Number-Grid Chart
  - Scope and Sequence Chart
- ◆ Per-grade Teacher Resources (Grades 1, 2, 3, 4, 5 and 6)
  - Teacher's Manual and Lesson Guide
  - Resource Book (blackline masters)
  - Assorted classroom posters and charts
- ◆ Cross-grade Teacher Resources
  - Teacher's Reference Manual (K–3)
  - Teacher's Reference Manual (4–6)
  - Towards a Balanced Assessment (K–3)
  - Towards a Balanced Assessment (4–6)
  - Creating Home-School Partnerships: A Guide for Administrators and Teachers (K–6)
  - Minute Math+ (1–3)
- ◆ Manipulative Kits for each grade level
- ◆ Some teacher materials available in Spanish

## Other Support Materials

- ◆ *Everyday Teaching for Everyday Mathematics*. Staff Development Kit (K–3)
- ◆ Grade-Level Videos for Staff Development, Grades 1–5
- ◆ *Everyday Mathematics: A K–6 Overview for Teachers*. Videotape
- ◆ *Everyday Mathematics: An Overview for Parents*. Videotape
- ◆ *Technology Guide and Software Correlations*
- ◆ *TeacherLink*, a newsletter for *Everyday Mathematics* teachers

## Current Availability of Curriculum Materials

- ◆ Grades K–6 materials are all available.

## Impact Data Compiled to Date

- ◆ *Student Achievement Studies* and *Student Achievement Studies, Volume 2*. Two booklets from the Everyday Learning Corporation presenting results of close to 30 studies and reports on districts using *Everyday Mathematics*.
- ◆ *Everyday Mathematics Success Stories*. Cases provided by Everyday Learning Corporation about districts' results from using *Everyday Mathematics*.
- ◆ *A Research Based Curriculum: The Research Foundations of the UCSMP Everyday Mathematics Curriculum*. Available from Everyday Learning Corporation or the University of Chicago School Mathematics Project.
- ◆ Additional implementation and achievement papers and information available from UCSMP.

## Web Sites

- ◆ At Everyday Learning Corporation: <http://www.everydaylearning.com>
- ◆ At UCSMP: <http://ars-www.uchicago.edu/ucsmp-el/>

# INVESTIGATIONS IN NUMBER, DATA AND SPACE®

An elementary school curriculum for grades K–5, developed by  
**Investigations in Number, Data and Space at TERC.**

The title of this program, *Investigations in Number, Data and Space*, reflects the view that mathematics in elementary school is more than arithmetic. In the elementary grades, students need to develop a foundation in several key content areas of mathematics: number, data, and geometry, or space. The *Investigations* curriculum also includes activities based on recent research on young children's understanding of the mathematics of change.

Each *Investigations* unit offers from two to eight weeks of mathematical work on topics in number, data analysis, and geometry; the number of units per year varies by grade level. Because of the many interconnections among mathematical ideas, units may revolve around two or three related areas—for example, addition and subtraction or geometry and fractions.

In each unit, students explore the central topics in depth through a series of investigations, gradually encountering and using many important mathematical ideas. Rather than working through a textbook or workbook doing page-by-page exercises, students actively engage with materials and with their peers to solve larger mathematical problems. Students use concrete materials and appropriate technology, including calculators, as a natural part of their work. They work in a variety of groupings: as a whole class, individually, in pairs, and in small groups.

What all the investigations have in common is students working in depth on a number of problems, actively using mathematical tools and consulting with peers as they find their own ways to solve the problems. The investigations allow significant time for students to think

about the problems and to model, draw, write, and talk about their work. In addition to the investigations, the curriculum also includes games and classroom routines that support mathematical thinking.

*Investigations* looks quite different from a traditional elementary program. While it provides all the information teachers need to implement a complete mathematics curriculum, there are no student textbooks. The main teaching tool is a single teacher resource book, called a curriculum unit, for each unit in a grade level. Each curriculum unit provides lesson plans, materials lists, reproducible student sheets for activities and games, assessment activities, and other support materials for teaching the unit. Some units at each grade level include computer software. Optional Student Activity books provide the reproducible unit pages from the Teacher Resource book in a booklet for each student. Investigations at Home booklets for every unit are designed to provide extra practice and to inform and involve families in this kind of mathematics.

## **Publisher Contact**

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## Student Materials

- ◆ Student Activity Booklets  
One per unit, Grades K–5
- ◆ Student Materials Kit, Grades K–5
- ◆ Student Activity Sheets are also available in Spanish
- ◆ Investigations at Home: family involvement booklets  
One per unit, Grades K–5

## Teacher Materials

- ◆ Curriculum Units
  - Kindergarten: 6 units      Grade 3: 10 units
  - Grade 1: 6 units      Grade 4: 11 units
  - Grade 2: 8 units      Grade 5: 9 units
- ◆ *Implementing the Investigations in Number, Data and Space Curriculum*, Grades K–2
- ◆ *Implementing the Investigations in Number, Data and Space Curriculum*, Grades 3–5
- ◆ Teacher Resource Package
  - Manipulatives
  - Overhead transparencies
  - Blackline masters
- ◆ Family Letters: explain the mathematics of each unit. Available in English, Spanish, Vietnamese, Cantonese, Hmong, and Cambodian.

## Other Support Materials

- ◆ *Recommendations for a Successful Implementation of Investigations in Number, Data and Space*. Two-page tipsheet based on notes from a Math Supervisor. Available from Dale Seymour Publications.
- ◆ *Beyond Arithmetic*. A handbook for educators who are transforming mathematics learning and teaching through programs such as *Investigations*, by Mokros, Russell, and Economopoulos. Available from Dale Seymour Publications.
- ◆ *Mathematics Curriculum Implementation: Not a Beginning, Not an End*, by Russell. An article available in the Spring 1998 issue of *Hands On!* Available from TERC.
- ◆ *Changing the Elementary Mathematics Curriculum: Obstacles and Challenges*, by Russell. Available from TERC.

## Current Availability of Curriculum Materials

- ◆ Grades K–5 materials are all available.

## Impact Data Compiled to Date

- ◆ *How Do We Know These Programs Work?* Available from Dale Seymour Publications.
- ◆ Results of pilot studies and other data available from TERC:
  - Full Year Pilot Grades 3 and 4, Investigations in Number, Data and Space*, by Mokros, Berle-Carman, Rubin and Wright.
  - Learning Operations: Invented Strategies That Work*, by Mokros, Berle-Carman, Rubin and O’Neil.

## Web Sites

- ◆ At Dale Seymour Publications: <http://www.awl.com/dsp/MainPages/Invest.html>
- ◆ At TERC: <http://www.terc.edu/investigations>

# MATH TRAILBLAZERS™

An elementary school curriculum for grades K–5, developed by Teaching Integrated Mathematics and Science (TIMS).

A fundamental principle of *Math Trailblazers* is that mathematics is best learned through active solving of real problems. Lessons are grounded in everyday situations, so abstractions build on experience. Students' skills, procedures, and concepts emerge and develop as they solve complex problems. The curriculum introduces challenging content at every grade level, including computation, measurement, data collection, statistics, geometry, ratio, probability, graphing, simple algebra, estimation, mental arithmetic, and patterns and relationships. Each grade level has 16–20 units; units range from one to three weeks long.

A central tenet of *Math Trailblazers* is that real problems are naturally interdisciplinary. Accordingly, the curriculum integrates mathematics with many disciplines, especially science and language arts.

Scientific investigations embedded in many units use the TIMS Laboratory Method, an organized method of investigation appropriate for elementary school children to use. Students explore a situation by drawing a picture, gathering and organizing data, graphing the data, and analyzing their results. The science content in *Math Trailblazers* is intended to supplement, rather than replace, a school's existing science curriculum.

*Math Trailblazers* also makes strong connections to language arts. As part of every lesson, students discuss and write about mathematics. Many lessons use trade books to launch or extend mathematical investigations. The curriculum itself contains original stories, called Adventure Books, that show applications of concepts being studied or episodes from the history of mathematics and science.

Many of the assessment activities in *Math Trailblazers* are incorporated into daily lessons; others are included in formal assessment units. Assessments include a mix of short, medium-length, and extended activities. Beginning in third grade, *Math Trailblazers* provides a scoring rubric for assessing students' work. An adaptation of this rubric allows students to assess their own work using the same criteria.

Components of the *Math Trailblazers* curriculum vary across grade levels. For grades 1 and 2, student materials are consumable, and consist of a Student Guide and a Discovery Assignment Book (containing student activity and homework pages) and an Adventure Book. For grades 3–5, Student Guides are hardcover, non-consumable texts and Adventure Books are spiral-bound, non-consumable texts; the Discovery Assignment Book for grades 3–5 is still consumable. Kindergarten student materials are reproducible pages contained in the teacher materials.

For every grade level, *Math Trailblazers* includes a Teacher Implementation Guide that provides background information and support for teachers on the pedagogy and content of the program. Teacher materials for grades 1–5 consist of Unit Resource Guide Files, which contain teacher support materials organized for each unit of the curriculum. Teacher materials for kindergarten also include a Teacher Resource Book.

*Math Trailblazers* requires the use of manipulatives. Calculator use is also integrated into the program, and is required for some activities.

## Publisher Contact

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## ***Student Materials***

- ◆ Student Guide, Grades 1–5  
(consumable, Grades 1–2)
- ◆ Discovery Assignment Book, Grades 1–5  
(consumable, Grades 1–5)
- ◆ Adventure Book, Grades 1–5  
(consumable, Grades 1–2)
- ◆ Math Manipulative Kit, Grades K–5

## ***Teacher Materials***

- ◆ Unit Resource Guides, Grades 1–5
- ◆ Individual Replacement Unit Guides, Grades 1–5
- ◆ Teacher Resource Book, K
- ◆ Teacher Implementation Guides, Grades K–5
- ◆ Quick Start, Grades K–5  
Unit summary, scope and sequence table of contents
- ◆ Letter Home in Spanish translation, Grades 1–5
- ◆ Generic Page: blackline masters, Grades 1–5
- ◆ Transparency Packages, Grades K–5
- ◆ Individual Assessment Record Sheets, Grades 1–3
- ◆ Answer Keys, Grades 1–2
- ◆ Wall Charts

## ***Other Support Materials***

- ◆ *A Look Inside Math Trailblazers*. Videotape

## ***Current Availability of Curriculum Materials***

- ◆ Grades K–5 materials are all available.
- ◆ Spanish editions of student materials expected to be available in Fall, 1999.

## ***Impact Data Compiled to Date***

- ◆ Preliminary results of Math Trailblazers implementation are available from the TIMS Implementation Center.

## ***Web Sites***

- ◆ At Kendall/Hunt Publishing Company: <http://www.kendallhunt.com>
- ◆ At the TIMS project at UIC: <http://www.math.uic.edu/IMSE/timsmath.html>

# CONNECTED MATHEMATICS™

A middle school curriculum for grades 6–8, developed by the **Connected Mathematics Project (CMP)**.

*Connected Mathematics* strives to develop student and teacher knowledge of mathematics that is rich in connections and deep in understanding and skill.

*Connected Mathematics*' goals can be summarized into a single standard: all students should be able to reason and communicate proficiently in mathematics. This includes knowledge and skill in vocabulary use, forms of representation, materials, tools, techniques, and intellectual methods of the discipline of mathematics including the ability to define and solve problems with reason, insight, inventiveness and technical proficiency.

*Connected Mathematics* defines skill as much more than just proficiency with computation and symbol manipulation. Skill in *Connected Mathematics* means that a student can use the mathematical tools, resources, procedures, knowledge, and ways of thinking developed over time to make sense of new situations.

The curriculum is structured around “big ideas” in mathematics—clusters of important, related concepts, processes, ways of thinking, skills, and problem solving strategies. The curriculum emphasizes significant connections among various mathematical topics and to applications in other disciplines. These connections also offer opportunities to revisit and deepen understanding of mathematical ideas.

Mathematical concepts are embedded in the context of interesting problems—real applications, whimsical settings, or mathematical problem situations. As students explore a series of connected problems they develop skill and deep understandings of mathematical ideas. Problem content becomes a vehicle for understanding and remembering concepts. The curriculum develops six mathematical strands—number, geometry, measurement, probability, statistics, and algebra.

*Connected Mathematics* is organized into units that investigate important mathematical ideas. Each unit contains four to seven investigations; each investigation explores one to five major problems in class to develop students' understanding and reasoning. The problem-centered teaching model consists of three phases: launching the problem, exploring the problem, and summarizing the problem. Extensive problem sets, called Applications, Connections, and Extensions (ACE), help students practice, apply, connect, and extend these understandings. Investigations culminate in Mathematical Reflections, helping students articulate their understandings and connect “big” mathematical ideas and applications.

*Connected Mathematics* gives students many ways to demonstrate how they make sense of the mathematics in the units. The Assessment Resources include check-ups, partner quizzes, projects, unit tests, self-assessments, and question banks. *Connected Mathematics* also suggests that students keep notebooks and journals for mathematical reflections, vocabulary, assessment, and other class work.

Students need access to calculators at all times. In the sixth grade, students use a standard scientific calculator. In grades 7 and 8, students need access to a graphing calculator. Optional computer software programs are suggested to enhance some of the units.

Each grade consists of eight units. Student materials are available in softcover, non-consumable modular form. A Teacher Guide accompanies each unit, and contains a discussion of the mathematics underlying the investigations within a unit and the instructional role of the teacher in orchestrating the classroom investigations. For each unit, the Guide gives a list of the materials needed, suggested timelines, homework assignment choices, and essential vocabulary. Teacher materials include blackline masters of consumable student pages and overhead transparencies.

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## **Student Materials**

- ◆ Student Editions of each unit, Grades 6–8
  - Grade 6: 8 units
  - Grade 7: 8 units
  - Grade 8: 8 units
- ◆ Student Materials Kits, Grades 6–8
- ◆ Some student materials available in Spanish at each grade level.

## **Teacher Materials**

- ◆ Teacher Guide Packages, Grades 6–8
  - Grade 6: 8 units
  - Grade 7: 8 units
  - Grade 8: 8 units
- ◆ *Getting To Know Connected Mathematics*
- ◆ Teacher Resource Kit, Grades 6–8
  - Transparencies
  - Blackline Masters
  - Assessment Resources

## **Other Support Materials**

- ◆ Scope and Sequence, Grades 6–8
- ◆ *Consultant Overview Sessions*: Successful implementation suggestions from administrator/teacher consultants.

## **Current Availability of Curriculum Materials**

- ◆ Grades 6–8 materials are all available.

## **Impact Data Compiled to Date**

- ◆ *How Do We Know These Programs Work?* Available from Cuisenaire • Dale Seymour Publications.
- ◆ *A Study of Proportional Reasoning of Seventh Grade Students*, by Ben-Chaim, Fey, Fitzgerald, Benedetto, and Miller. *Connected Mathematics* and non-*Connected Mathematics* students. Available from Cuisenaire • Dale Seymour Publications.
- ◆ *Effects of the Connected Mathematics Project on Student Attainment*, by Hoover, Zawojewski, and Ridgway. Available from Cuisenaire • Dale Seymour Publications.

## **Web Sites**

- ◆ At Cuisenaire • Dale Seymour Publications: <http://www.awl.com/dsp/MainPages/CMP.html>
- ◆ At Michigan State University: <http://www.math.msu.edu/cmp>

# MATHEMATICS IN CONTEXT™

A middle school curriculum for grades 5–8, developed by the **Mathematics in Context (MiC)** project.

*Mathematics in Context* is a comprehensive middle school mathematics curriculum for grades 5 through 8. It was developed by the Wisconsin Center for Education Research, School of Education, University of Wisconsin-Madison and the Freudenthal Institute at the University of Utrecht, The Netherlands.

Connections are a key feature of the program—connections among topics, connections to other disciplines, and connections between mathematics and meaningful problems in the real world. *Mathematics in Context* emphasizes the dynamic, active nature of mathematics and the way mathematics enables students to make sense of their world.

In traditional mathematics curricula, the sequence of teaching often proceeds from a generalization, to specific examples, and to applications in context. *Mathematics in Context* reverses this sequence; mathematics originates from real problems. The program introduces concepts within realistic contexts that support mathematical abstraction.

*Mathematics in Context* consists of mathematical tasks and questions designed to stimulate mathematical thinking and to promote discussion among students. Students are expected to explore mathematical relationships; develop and explain their own reasoning and strategies for solving problems; use problem-solving tools appropriately; and listen to, understand, and value each other's strategies.

The complete *Mathematics in Context* program contains 40 units, 10 at each grade level. The units are organized into four content strands: number, algebra, geometry, and

statistics. Every *Mathematics in Context* unit consists of a Teacher Guide and non-consumable, softcover student booklet.

The Teacher Guides contain the solutions to the exercises; a list of unit goals; and objectives, comments, and suggestions about the approach and the mathematics involved in the unit. The guides include assessment pieces for each unit, including tests, quizzes, and suggestions for ongoing assessment. The guides also provide blackline masters for exercises requiring students to have copies of the text page.

Also available are two supplementary packets for teachers: the Teacher Resource and Implementation Guide (TRIG) and Number Tools. The TRIG manual is a comprehensive guide for the implementation of *Mathematics in Context*. It addresses topics such as suggested sequence of units, preparation for substitute teachers, preparing families, assigning homework, and preparing students for standardized achievement tests. Number Tools, Volumes I and II, give students further exposure to number concepts, including fractions, decimals, percents, and number sense. The activity sheets are supported by a context similar to those in the curriculum units and can be used as homework and quizzes on classroom activities.

Manipulatives used in the program are items commonly found in the classroom, such as scissors, coordinate paper, string, and integer chips. As students progress to later units, the need for a personal calculator increases. The eighth grade units were written with the expectation that students would have access to graphing calculators.

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## **Student Materials**

- ◆ Student Booklets for each unit,

Plan A (5–8)	Plan B (6–8)
Grade 5, 10 units	
Grade 6, 10 units	Grade 6, 10 units
Grade 7, 10 units	Grade 7, 10 units
Grade 8, 10 units	Grade 8, 10 units
- ◆ Student Booklets also available in Spanish

## **Teacher Materials**

- ◆ Teacher Guide for each unit includes:
  - Blackline Masters
  - Assessment Packages
- ◆ Teacher Resource and Implementation Guide
- ◆ *Number Tools*, Volumes I–II
- ◆ *News in Numbers*

## **Other Support Materials**

- ◆ MiC Internet Support Group. Designed for teachers to ask questions about MiC implementation throughout the school year; the MiC Consulting Group will respond within 48 hours.
- ◆ *MiC Parent Brochure*.
- ◆ Optional Manipulative Kits available through ETA: (800) 445-5985.
- ◆ *Suggested Software Integration to MiC Units*.
- ◆ *Mathsphere* and *Mathsense* videos. May be used to introduce concepts and help students make additional mathematical connections.
- ◆ *Pacing Strategies for Each MiC Unit*. Provides pacing suggestions and highlights *Core Ideas* of each unit.
- ◆ *MiC Scope and Sequence*. (Plan A, 5–8) and (Plan B, 6–8).

## **Current Availability of Curriculum Materials**

- ◆ All materials for Grades 5–8 are currently available.
- ◆ Half of the student materials are currently available in Spanish. The remainder will be available later in the 1999-2000 school year.

## **Impact Data Compiled to Date**

- ◆ *The Impact of the Mathematics in Context Curriculum*. Impact data, shared with the Mathematics in Context project staff, from three districts which used the curriculum for at least two years. Available from the Mathematics in Context Satellite Center.
- ◆ Data from a National Science Foundation-funded three year longitudinal and cross-sectional study of the impact of *Mathematics in Context* on student mathematics performance will be made available in early 1999 from the MiC Satellite Center.

## **Web Site**

- ◆ At Encyclopedia Britannica, Inc.: <http://www.ebmic.com>

# MATHSCAPE: SEEING AND THINKING MATHEMATICALLY™

A middle school curriculum for grades 6–8, developed by the **Seeing and Thinking Mathematically** project at EDC.

*MathScape* is a comprehensive, three-year middle school mathematics curriculum that focuses on mathematics in the human experience. Throughout the 21 units of this curriculum, students experience mathematics as fundamental to human endeavors throughout the world and through history—endeavors such as planning, predicting, designing, creating, exploring, explaining, coordinating, comparing, and deciding.

The curriculum focuses on four mathematical strands that develop across the three grade levels: number; algebra; geometry and measurement; and statistics and probability. *MathScape* supports students in learning mathematics by having them do mathematics, use and connect mathematical ideas, and actively construct their own understandings.

There are seven *MathScape* units at each grade level. Each unit provides about 5–6 weeks of material and explores several mathematical topics in depth, such as “what is a function?” or “how do you interpret information on Cartesian graphs?” The mathematics is presented in contexts designed to appeal to middle school students, such as music, sports, and architecture, as well as in purely mathematical contexts. The curriculum engages students in hands-on investigations that involve mathematical concepts, skills, and processes, and provides opportunities for practice and application of basic skills. Lessons prompt students to work collaboratively with their classmates, communicate about mathematics in class discussions and writing, and reflect on their thinking and learning.

Each unit of the program features an assessment package with options that allow teachers to choose when and how

to assess students. Resources include embedded assessment tasks with detailed rubrics and sample student work; skill quizzes; final projects; pre-assessment tasks; and suggestions for using portfolios.

*MathScape* teacher materials support teachers in using the materials flexibly to meet the needs of their students. The Teacher’s Guides include detailed lesson plans; reproductions of the student pages; sample student work; homework options; reproducibles; and From the Classroom comments and tips from teachers who have taught the materials. Each guide also provides Math Background pages where teachers can find information about the mathematics of the unit.

Calculators are used throughout the curriculum. Each unit identifies Technology Options, appropriate junctures for the use of spreadsheets and other optional computer software programs. Suggestions for using graphing calculators are provided throughout the eighth grade units.

Each of the *MathScape* units consists of a Teacher’s Guide and a non-consumable student book. The student books are also available as a hardcover consolidated text (one per grade). The units are supplemented by a skills resource book called *Hot Words, Hot Topics* (one student book and one teacher’s book per grade level). Most of the units involve the use of manipulative materials.

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## **Developer/Implementation Center**

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## **Student Materials**

- ◆ Student Editions of each unit.
  - Grade 6: 7 modular units
  - Grade 7: 7 modular units
  - Grade 8: 7 modular units
- OR
- Bound Student Text: 1 per grade
- ◆ *Hot Words, Hot Topics Math User's Handbook for Students*
  - Grade 6: 1 book
  - Grade 7: 1 book
  - Grade 8: 1 book

## **Teacher Materials**

- ◆ Teacher Editions of each unit.
  - Grade 6: 7 modular units
  - Grade 7: 7 modular units
  - Grade 8: 7 modular units
- ◆ *Hot Words, Hot Topics Math User's Handbook for Teachers*
  - Grade 6: 1 book
  - Grade 7: 1 book
  - Grade 8: 1 book
- ◆ Manipulative Kits available for each module

## **Other Support Materials**

### **Current Availability of Curriculum Materials**

- ◆ Grades 6–8 materials are all available.

### **Impact Data Compiled to Date**

- ◆ *Research Done During Field-Testing of the MathScape Curriculum.* Available from the MathScape/STM Curriculum Center at EDC.

### **Web Sites**

- ◆ At Creative Publications: [http://www.creativepublications.com/mathScape/mathscape\\_frameSet.html](http://www.creativepublications.com/mathScape/mathscape_frameSet.html)
- ◆ At Education Development Center: <http://www.edc.org/mathscape>

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# MATH *THEMATICS*

A middle school curriculum for grades 6–8, developed by the **STEM Project: Six Through Eight Mathematics**.

MATH *Thematics* is a complete three-year mathematics curriculum for students in grades 6 to 8. This program presents mathematics in relevant and meaningful contexts; each module focuses on a theme that extends throughout the module. The goals of this program are to help all students develop their abilities to reason logically, apply mathematical skills to real-life activities, communicate mathematically, and feel confident in using quantitative and spatial information to make decisions. Major mathematical strands of the program include: number concepts, measurement, probability, statistics, algebra, geometry, and discrete mathematics.

The instructional approach engages students in doing mathematics in a variety of settings. It encourages active learning, and students work both independently and in cooperative groups to investigate mathematics and solve real-life problems. Not all instruction, however, is through discovery learning; the program includes direct instruction in concepts and skills as well. The curriculum includes practice, review, and extension exercises that reinforce and extend learning.

Assessment is an integral part of the MATH *Thematics* materials. Each grade-level course begins by introducing students to assessment criteria that are used for assessing problem solving and mathematics communication on open-ended problems and projects throughout the modules. Other assessment tools include “checkpoint” questions that check students’ understanding as they are exploring mathematics; reflection exercises that ask students to describe, summarize, and extend mathematical ideas; module assessments that ask students to reflect on a module as a whole; and portfolio projects

that can be used to assess whether students can apply what they have learned.

MATH *Thematics* assumes that students have access to a scientific calculator. Graphing calculators can benefit students in the eighth grade modules, but are not required.

Each of the three grade levels of MATH *Thematics* includes eight modules; each module requires about four weeks of instruction. The modules are available as a consolidated text for each grade level. Accompanying each grade level is a Teacher’s Resource Package, which includes an annotated Teacher’s Edition (with warm-up activities, closure questions, and answers to all student text exercises and questions), a Professional Development Handbook (which outlines program philosophy, assessment, and scoring rubrics) and Teacher’s Resource Books (which provide module-by-module teaching strategies, classroom management tips, and blackline masters).

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## **Developer/Implementation Center**

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## ***Student Materials***

- ◆ Pupil's Editions
  - Book 1: Grade 6
  - Book 2: Grade 7
  - Book 3: Grade 8
- ◆ Student Manipulative Kits

## ***Teacher Materials***

- ◆ Teacher's Resource Packages (each grade level)
  - Annotated Teacher Edition
  - Resource Book, Modules 1 & 2
  - Resource Book, Modules 3 & 4
  - Resource Book, Modules 5 & 6
  - Resource Book, Modules 7 & 8
  - Professional Development Handbook
- ◆ Teacher Overhead Manipulatives
- ◆ Glossary for each book available in Spanish.

## ***Other Support Materials***

- ◆ Real Math–Real Careers laserdisk series (6 disks).

## ***Current Availability of Curriculum Materials***

- ◆ Pupil's Editions of all books are currently available.
- ◆ Teacher's Editions and Resource Packages for all grades are currently available.

## ***Impact Data Compiled to Date***

- ◆ Field test and materials evaluation results available from McDougal Littell.

## ***Web Sites***

- ◆ At McDougal Littell: <http://www.mlmath.com>
- ◆ At the University of Montana: <http://www.math.umt.edu/~stem>

# MIDDLE-SCHOOL MATHEMATICS THROUGH APPLICATIONS

A middle school curriculum for grades 6–8, developed by the  
**Middle-school Mathematics Through Applications Project**

*Middle-school Mathematics through Applications* (MMAP) is a flexible middle-school mathematics curriculum which integrates computer technology and interdisciplinary links. The MMAP program is composed of three kinds of units: Applications, Extensions, and Investigations. Applications units form the core of the curriculum. Each unit places students in an extended role play based on real-life work and problem solving. In the role play, students “work” for a design company, creating codes, floor plans, maps, or biological models. Mathematical concepts and skills are integrated and developed along the way; the design context provides grounded reasons and resources for developing the mathematics. Applications units integrate mathematical software developed for use with MMAP; the developers estimate that 40–60 percent of students’ work in these units requires the use of computers.

Extensions units build directly on the mathematical insights and skills students have developed within the Applications units. They introduce students to standard mathematical notations associated with concepts such as proportion, help students develop specific skills such as manipulating algebraic expressions, and deepen their conceptual understanding.

Investigations units introduce other mathematical concepts, within more fanciful contexts or from a pure mathematics point of view. In these units, students learn such things as geometric vocabulary in the context of quilting or methods of proof while exploring relationships between even and odd integers. Investigations units emphasize mathematics concepts, common notations, and vocabulary, along with

mathematical practices such as making conjectures, coming up with counter-examples, and writing proofs.

A variety of assessment tools are provided and techniques are recommended for incorporating assessment into the activities of each unit. Assessment pages exist at the beginning of each section within the units. Additional resources include an Assessment Sampler that describes MMAP’s assessment philosophy and provides resource pages, and an Assessment Supplement that offers a collection of tips for using assessment in MMAP units.

The MMAP program requires student access to a set of mathematical tools that includes calculators and measuring tools. MMAP software runs on any Macintosh computer that has a hard drive and uses System 7.0 or newer. A word processing and spreadsheet program are recommended for use with the program as well.

MMAP units combine to create a comprehensive program for grades 6 through 8. Units may be used flexibly or integrated with other instructional materials to customize a program to meet local needs.

## **Publisher Contact**

Commercial publisher to be announced.

## **Developer/Implementation Center**

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## **Student Materials**

- ◆ Reproducible handouts and software contained within the Teacher Editions.

## **Teacher Materials**

- ◆ Applications Units: Teacher's Guides with software. Programs include: *Architech*, *Habitech*, *Mapper*, *Coding Toolbox*
  - Grades 6/7: 7 Applications Units
  - Grades 7/8: 6 Applications Units
- ◆ Extensions for each Applications Unit
  - Grades 6/7: 7 Extensions
  - Grades 7/8: 10 Extensions
- ◆ Investigations Units
  - Grades 6/7: 6 Investigations
  - Grades 7/8: 4 Investigations

## **Other Support Materials**

- ◆ *A Guide to MMAP*, October 1997.

## **Current Availability of Curriculum Materials**

- ◆ Drafts of materials are available from the MMAP Implementation Center.

## **Impact Data Compiled To Date**

- ◆ Some impact data available upon request from the Institute for Research on Learning.

## **Web Site**

- ◆ At the Institute for Research on Learning: <http://www.irl.org/mmap/>

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# CONTEMPORARY MATHEMATICS IN CONTEXT

A high school curriculum for grades 9–12, developed by  
the **Core-Plus Mathematics Project**

*Contemporary Mathematics in Context* is a four-year, integrated mathematics program that includes a three-year core curriculum for all students, plus a flexible fourth-year course that continues to prepare students for college mathematics. The curriculum builds on the theme of mathematics as sense making.

Each year-long course of the curriculum features four interwoven strands: algebra and functions, geometry and trigonometry, statistics and probability, and discrete mathematics. The program emphasizes mathematical modeling and modeling concepts, including data collection, representation, interpretation, prediction, and simulation. The modeling perspective permits students to experience mathematics as a means of making sense of data and problems through the investigation of real-life contexts. Graphics calculators are an integral tool used by students in every unit.

Lessons are organized in a four-phase cycle: Launch—a whole-class discussion establishing a context for the lesson; Explore—small-group investigation of more focused real-world problems; Share and Summarize—a whole-class discussion enabling groups to summarize results of investigations and construct a shared understanding of important concepts, methods and approaches; and Apply—a task to be completed individually to assess understandings gained in the lesson.

In addition to the classroom investigations, the program provides sets of MORE tasks, which engage students in Modeling with, Organizing, Reflecting on, and Extending their mathematical knowledge. These tasks are intended for individual work outside of class. The program also includes opportunities to assess student learning in whole-group “Checkpoint” discussions, and “On Your Own” tasks.

Each course of the curriculum consists of seven units and a capstone experience. Each unit has four to six multi-day lessons which develop major ideas through investigations of applied problems. The time needed to complete units varies from four to six weeks. The final element of each course, the Capstone, is a thematic, two-week, project-oriented activity that enables students to synthesize and apply the important mathematical concepts and methods developed in the course.

Student materials for Courses 1, 2, and 3 of the curriculum are available in two parts, A and B, both in hardcover. (The fourth year course is still under development.) For each course of the published curriculum, there are also two hardcover Teacher’s Guides, in parts A and B, that correspond to the students’ texts. The Teacher’s Guides contain full-size student text pages with facing pages containing answers, suggested student responses, points for discussion, suggestions for promoting student investigation and collaborative work, and background information. Also available is an Implementation Guide that supports teachers in using the program effectively.

Other teacher support materials include Assessment Resources (which include quizzes, exams, and projects for each unit) and Teaching Resources (which include blackline masters that support classroom activities) for each course. Software developed for the TI-82, TI-83, and TI-92 graphing calculators supports student investigations, and is required for some activities.

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## **Student Materials**

- ◆ Student Text, Courses 1–3
  - Part A (Units 1–4)
  - Part B (Units 5–7 plus Capstone)

## **Teacher Materials**

- ◆ Teacher's Guide, Courses 1–3, Parts A & B
- ◆ Teaching Resources, Courses 1–3, Parts A & B
- ◆ Assessment Resources, Courses 1–3, Parts A & B
- ◆ Calculator Software and Guide, Courses 1–3

## **Other Support Materials**

- ◆ *Implementing the Core-Plus Mathematics Curriculum*
- ◆ *A Balanced Approach to Mathematics Education*
- ◆ *The Core-Plus Mathematics Project Contemporary Mathematics in Context: An Overview*. A 30-minute video.

## **Current Availability of Curriculum Materials**

- ◆ Courses 1–3 are currently available.
- ◆ Course 4 is in development and undergoing field tests.

## **Impact Data Compiled to Date**

- ◆ *Assessments of Students' Mathematical Performance: A Core-Plus Mathematics Project Field Test Progress Report*. H. Schoen & S. Ziebarth, January 1998. Available from the Core-Plus Mathematics Project.
- ◆ *Mathematical Achievement on Standardized Tests: A Core-Plus Mathematics Project Field Test Progress Report*. H. Schoen & S. Ziebarth, January 1998. Available from the Core-Plus Mathematics Project.
- ◆ *An Emerging Profile of the Mathematical Achievement of Students in the Core-Plus Mathematics Project*. H. Schoen, C. Hirsch & S. Ziebarth, April 1998. Available from the Core-Plus Mathematics Project.
- ◆ *Contemporary Mathematics in Context Field Test Results*. Available from Everyday Learning Corporation.
- ◆ *Contemporary Mathematics in Context Student Achievement Results, Volume I*. Available from Everyday Learning Corporation.

## **Web Sites**

- ◆ At Everyday Learning Corporation: <http://www.everydaylearning.com>
- ◆ At Western Michigan University: <http://www.wmich.edu/cmpm>

# INTERACTIVE MATHEMATICS PROGRAM™

A high school curriculum for grades 9–12, developed by the Interactive Mathematics Program (IMP).

The *Interactive Mathematics Program (IMP)* is a four-year curriculum of problem-based, integrated mathematics designed to replace the traditional Algebra I, Geometry, Algebra II/Trigonometry, Pre-Calculus sequence. IMP integrates traditional mathematics with additional topics recommended by the NCTM *Curriculum and Evaluation Standards*, such as statistics, probability, discrete mathematics, and matrix algebra. By combining traditional concepts and newer material in an integrated setting, and by placing these ideas in meaningful contexts, the IMP curriculum meets the needs of both college-bound students and those headed directly into the workforce.

Most units begin with a central problem that students explore over the course of six to eight weeks. Some of these central problems are based on practical, real-world situations, such as maximizing profits for a business or studying population growth. Others are more fanciful, involving situations like a pennant race or a circus act. As students work through smaller problems in the unit, they develop the mathematical concepts and techniques they need to solve the central problem. A particular unit may combine several branches of mathematics so that students see how important ideas are related to one another.

There are three main types of student assignments in IMP: in-class activities, daily homework, and Problems of the Week (POWs). Students examine new concepts through in-class activities, working in groups and individually. Homework assignments reinforce and extend concepts introduced in class. POWs are open-ended problems, often mathematical classics, that cannot be solved easily in a very short period of time. In POW

write-ups, students describe how they worked on the problem and explain their reasoning.

Each unit also includes a collection of supplemental problems, both to reinforce concepts and skills and to extend ideas beyond the basic curriculum. These problems provide a way to tailor the curriculum to meet the needs of individual students.

IMP requires the use of a graphing calculator during class. There are many IMP activities in which computer programs could provide valuable enrichment, but there are no activities that require computer use.

Teachers assess individual students in IMP using a variety of tools, including daily homework assignments, oral presentations, contributions to the group or whole-class discussions, Problems of the Week, in-class and take-home unit assessments, end-of-semester examinations, self-assessments, and portfolios.

Student materials for IMP are available in one hardcover textbook for each of the four years of the program. Accompanying Teacher's Guides are published in softcover for each of the units in a grade level. Additional teacher support materials include *Introduction and Implementation Strategies for the Interactive Mathematics Program*; the *Teaching Handbook for IMP: A Teacher-to-Teacher Guide*; *Baker's Choice—A Unit of High School Mathematics*; *It's All Write: A Writing Supplement for High School Mathematics*; and the *Guide to Using TI Calculators with IMP*.

## **Publisher Contact**

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## Student Materials

- ◆ Student Texts, Grades 9–12
  - Year 1, Grade 9
  - Year 2, Grade 10
  - Year 3, Grade 11
  - Year 4, Grade 12

## Teacher Materials

- ◆ Modular Teacher's Guides, Grades 9–12
  - 5 units, Year 1
  - 5 units, Year 2
  - 5 units, Year 3
  - 5 units, Year 4

## Other Support Materials

- ◆ *Introduction and Implementation Strategies for the Interactive Mathematics Program: A Guide for Teacher-Leaders and Administrators*
- ◆ *Baker's Choice—A Unit of High School Mathematics*. Student Text, Teacher's Guide and student blackline masters for this three-week unit.
- ◆ *It's All Write: A Writing Supplement for High School Mathematics Classes*. Teacher's Guide and student blackline masters for this one-week unit.
- ◆ *Teaching Handbook for IMP: A Teacher-to-Teacher Guide*
- ◆ *Guide to Using TI Calculators with IMP Year 1*, *Guide to Using TI Calculators with IMP Year 2*, and *Guide to Using TI Calculators with IMP Year 3*
- ◆ Years 1 and 2 Student Texts in Spanish are currently available from IMP.
- ◆ Years 1 and 2 Student Texts in French are currently available from Cheneliere/McGraw Hill, 7001 bouf Saint-Lauren, Montréal, (Québec), Canada H2S 3E3.
- ◆ Years 1 and 2 Student Texts in Hawaiian are currently available from Kathy Nishimura, Office of Instructional Services, 189 Lunalilo Home Road, 2nd floor, Honolulu, HI 96825.

## Current Availability of Curriculum Materials

- ◆ Years 1–3 (Grades 9–11) are currently available.
- ◆ Year 4 (Grade 12) is currently available in pre-publication draft and will be published in August 1999.
- ◆ *Guide to Using TI Calculators with IMP Year 4* will be published in August 1999.

## Impact Data Compiled to Date

- ◆ *Evaluation Update, No. 1, Spring 1995* available from the Interactive Mathematics Program.
- ◆ *Evaluation Update, No. 2, Fall 1996* available from the Interactive Mathematics Program.
- ◆ *Evaluation Update, No. 3, Fall 1997* available from the Interactive Mathematics Program.

## Web Sites

- ◆ At Key Curriculum Press: <http://www.keypress.com>
- ◆ At Interactive Mathematics Program: <http://www.mathimp.org>

# MATH CONNECTIONS<sup>®</sup>

## A SECONDARY MATHEMATICS CORE CURRICULUM

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Three years of high school mathematics curriculum.

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The vision of MATH *Connections* is that all students can learn mathematics. MATH *Connections* is a complete three-year high school curriculum for all students that has as its mission the conceptual development of the learner. Using the NCTM Standards as a guideline and replacing traditional Algebra I, Geometry, Algebra II, MATH *Connections* blends the mathematics of algebra, geometry, trigonometry, probability, statistics, and discrete mathematics. As its name suggests, the curriculum bridges connections of all sorts: those between different mathematical areas; mathematics and science; mathematics and other subject areas; and mathematics and the real world of people, business and everyday life.

MATH *Connections* is concept driven. That is, concepts are introduced in the context of real world applications, problems and projects. Rather than teaching a single topic, MATH *Connections* uses broader concepts to link topics together in a unified, interconnected approach.

MATH *Connections* is designed to provide students with experiences that excite their curiosity, stimulate their imagination, and challenge their skills. The pedagogical approach of MATH *Connections* is flexible. It is intended to meet the needs of all students by making a concerted effort to accommodate a variety of student learning styles and levels. The materials support a combination of teacher-student and student-student interaction, hands on investigations with prompts for class discussion, individual activities and student writing and justification of results.

Student assessment in MATH *Connections* includes written, oral, and demonstration formats that assess

higher order thinking skills. In this way, students demonstrate their mathematical skills, their approach to non-routine, real world problems, and their understanding of mathematics concepts and how they relate to one another.

The curriculum integrates technology through the use of graphing calculators and computers, which students use to make conjectures; validate findings; and investigate concepts, problems, and projects in greater depth. The program encourages students to use these tools when appropriate. Discussions of how the tools work, why they work, and whether or not they are appropriate for a particular task occur throughout the course.

The Student Edition is published in six half-year, hardbound textbooks. The Teacher Edition is organized in half-year sections in binders to accommodate different teaching styles and traditional and block scheduling. The Teacher Resource Pack includes the Teacher Edition, a replica of the Student Edition, a Teacher Commentary which is correlated to the Teacher Edition and provides professional development; Blackline Masters for use as overheads or classroom handouts; and a full set of Form A MATH *Connections* Student Assessments with Solution Keys and Scoring Guides.

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### **Developer/Implementation Center**

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## **Student Materials**

- ◆ Student Edition (3 years)  
6 half-year hardbound color textbooks

## **Teacher Materials**

- ◆ Teacher Resource Pack (3 years)  
Teacher Edition, replica of the Student Edition  
(6 half-year texts in binders)  
Teacher Commentary, correlated to the  
Teacher Edition  
Blackline Masters  
Form A MATH *Connections* Student Assess-  
ments with Solution Keys and Scoring Guides

## **Other Support Materials**

- ◆ Form B MATH *Connections* Student Assessments with Solution Keys and Scoring Guides
- ◆ *Extensions*. Correlated to the text, for students interested in exploring topics in greater depth and breadth.
- ◆ Supplementary materials for reinforcement learning for students to improve their proficiency as well as to accommodate students who have been absent or who are entering the program midstream.
- ◆ *The User-Friendly Booklet Introducing MATH Connections to Students and Their Families*
- ◆ Videos for teachers and administrators

## **Current Availability of Curriculum Materials**

- ◆ Student Textbooks and Teacher Resource Packs for all grades are now available from *It's About Time, Inc.*
- ◆ Introductory Pack, available from the MATH *Connections* Implementation Center:
  - Video (11 minutes of classes in action)
  - Sample Lessons and Assessments
  - Careers, Professions & Real Life Applications in MATH *Connections* Problems, Explorations, Simulations & Situations Fact Sheet
  - NCTM Standards (9-12) Exemplified in MATH *Connections*

## **Impact Data Compiled to Date**

- ◆ See "Evaluation Summary" at the MATH *Connections* web site for student results of standardized tests including the Scholastic Aptitude Test (SAT), student confidence in learning mathematics, student perception of the usefulness of mathematics, and external evaluation of cognitive discourse in the classroom.
- ◆ "Evidence of Effectiveness and Success" available from the MATH *Connections* Implementation Center.
- ◆ Data showing the success of MATH *Connections* students in college and university attendance. Further information is available from the MATH *Connections* Implementation Center.
- ◆ Data showing that MATH *Connections* has been recognized by the NCAA for sports eligibility requirements. Further information is available from the MATH *Connections* Implementation Center.

## **Web Site**

- ◆ At the MATH *Connections* Implementation Center: <http://www.mathconnections.com>

# MATHEMATICS: MODELING OUR WORLD

A high school curriculum for grades 9–11, developed by the  
**Consortium for Mathematics and Its Applications (COMAP), Inc.**

*Mathematics: Modeling Our World* is an integrated core curriculum for high school that is based on the premise that students learn best when they are actively involved in the process. In this program students do not first learn mathematics and then apply what they've learned. Rather, important questions about the real world come first. Students analyze situations and apply the mathematical concepts needed to solve problems. Contextual questions drive the mathematics. In each unit, students build, test, and present models that describe a real-world situation or problem, such as deciding where to build a fire station. Mathematical modeling is a central focus throughout the curriculum.

Each course covers the mathematical content found in the NCTM *Standards*. Each of the first three courses of *Mathematics: Modeling Our World* contains seven or eight units. Units are divided into four to seven lessons; each may take several days to complete. Each lesson contains a Lesson Opener, which provides the context for the lesson; Activities, which students work on in pairs or small groups using hands-on mathematical investigation; and Individual Work, items that review, reinforce, extend, practice, and foreshadow concepts developed in the lesson.

Assessment is an integral part of *Mathematics: Modeling Our World*. Both Activities and Individual Work offer embedded opportunities to assess student progress. The Teacher's Resources provide Assessment Problems for use with each unit, as well as unit projects. A "Wrapping Up" problem set at the end of each unit provides more opportunities for students to review what they have learned.

The units of *Mathematics: Modeling Our World* begin with a real situation or problem to be solved during the course of the unit. A short video segment may be used to introduce the theme or problem. Students use both graphing calculators and computers extensively throughout the curriculum to assist in carrying out computations of real problems and to enhance concept development. While it is strongly recommended that students use computers with this curriculum, material is provided to teach the lessons without computers as well. However, use of the graphing calculator is essential throughout the program.

Student materials for *Mathematics: Modeling Our World* are available in three hardcover texts, one each for Courses 1, 2, and 3. Teachers materials include, for each course, an Annotated Teacher's Edition, a Solutions Manual, and Teacher's Resources, which contains additional teaching suggestions, background readings, reproducible handouts, assessment problems, supplemental activities, and transparencies. Other materials include a video with segments for each unit and a CD-ROM with calculator and computer programs written specifically for *Mathematics: Modeling Our World*.

Course 4, geared for grade 12, is currently under development and is being field-tested.

## **Publisher Contact**

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South-Western Educational Publishing  
An International Thomson Publishing Company  
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phone: (800) 824-5179  
fax: (800) 539-1623

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## ***Student Materials***

- ◆ Student Editions, Courses 1–3 (Grades 9–11)

## ***Teacher Materials***

Included for each course:

- ◆ Annotated Teacher's Edition
- ◆ Teacher's Resources: a binder containing a teacher's guide with additional notes and background reading, Supplemental Activities, Assessment Problems, Handouts, and Transparencies.
- ◆ Solutions Manual
- ◆ Video with a documentary for each unit
- ◆ CD-ROM with programs for graphing calculators and computers

## ***Other Support Materials***

## ***Current Availability of Curriculum Materials***

- ◆ Courses 1–3 are currently available.
- ◆ Course 4 (Grade 12) is under development.

## ***Impact Data Compiled to Date***

## ***Web Sites***

- ◆ At South-Western Educational Publishing: <http://www.swep.com>
- ◆ At COMAP: <http://www.comap.com>

# SIMMS INTEGRATED MATHEMATICS

A high school curriculum for grades 9–12, developed by the **Systemic Initiative for Montana Mathematics and Science (SIMMS)**.

*SIMMS Integrated Mathematics* (SIMMS IM) is a complete 9–12 mathematics curriculum that uses real-world contexts in an integrated approach for all students. It is designed to replace all secondary mathematics courses, with the possible exception of advanced placement courses. SIMMS IM considers mathematical topics in a different order than in a traditional curriculum, and teaches some mathematical topics not usually encountered at the high school level. The curriculum includes work in algebra, geometry, trigonometry, analysis, statistics, probability, matrices, and data analysis, as well as less traditional high school topics such as graph theory, game theory, and chaos theory.

SIMMS IM materials are partitioned into six levels; each level is a year's worth of material. All students take Levels 1 and 2 as a core curriculum. In the third and fourth years, SIMMS IM offers a choice of options. Level 3 is suitable for all students; Level 4 is intended for those planning careers in mathematics or science. Levels 5 and 6 offer options for students in the fourth year: Level 5 focuses more specifically on applications from business and the social sciences; Level 6 materials continue the presentation of mathematics through applied contexts while embracing a broader mathematical perspective. Each year-long level contains 13–16 modules; each module takes between two and three weeks.

SIMMS IM invites the use of a variety of instructional formats, including individual and cooperative group work, whole-class discussions, and individual and group projects. Each module has a central theme, and includes 3–4 activities. The activities use hands-on explorations, discussions, and assignments to guide students to a

common understanding of the mathematics within it. "Mathematics Notes" sections in the text furnish students with definitions, symbolism, and appropriate examples. Additional features of the curriculum include research projects and brief sets of problems called "flashbacks" for additional practice of procedural skills.

Assessment materials—including alternative assessments that emphasize writing and logical argument—are an integral part of the curriculum. Suggested assessment items for use with a standard rubric are identified in all teacher editions. Assessment is an integral part of the Exploration, Discussion, Assignment, and Flashback sections of every module. In addition, each module has a Summary Assessment that is open-ended and often project-oriented, as well as a Module Assessment.

Technology is an important part of the SIMMS IM curriculum. Students must have ready access to the functionality of a graphing utility, spreadsheet-like features, geometric visualization, a statistics program, a symbolic manipulator, and a word processor (a graphing calculator such as the TI-92 has all of these functions). In addition, students should have access to a science-interface device (such as Texas Instruments' CBL (Calculator-Based Laboratory)<sup>TM</sup>) that allows for electronic data collection from classroom experiments.

SIMMS IM student materials are available in three non-consumable, softcover volumes for each grade level. Teachers' editions correspond to the student materials: three softcover, non-consumable volumes at each grade level.

## **Publisher Contact**

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(800) 693-4060 (curriculum information)  
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## **Developer/Implementation Center**

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## **Student Materials**

- ◆ Student Editions of each volume, Levels 1–6
  - Level 1 (9th grade): 3 volumes
  - Level 2 (10th grade): 3 volumes
  - Level 3 (3rd Year): 3 volumes
  - Level 4 (3rd Year): 3 volumes
  - Level 5 (4th Year): 3 volumes
  - Level 6 (4th Year): 3 volumes

## **Teacher Materials**

- ◆ Teacher Editions of each volume, Levels 1–6
  - Level 1 (9th grade): 3 volumes
  - Level 2 (10th grade): 3 volumes
  - Level 3 (3rd Year): 3 volumes
  - Level 4 (3rd Year): 3 volumes
  - Level 5 (4th Year): 3 volumes
  - Level 6 (4th Year): 3 volumes

## **Other Support Materials**

- ◆ *SIMMS Resource Guide for Administrators, Counselors and Other Educators*
- ◆ *Restructuring Mathematics Assessment: Suggestions from the Classroom*
- ◆ *SIMMS in the Classroom*. Videotape: Levels 1–6
- ◆ Curriculum Sampler
- ◆ Objectives/Content Outline
- ◆ Content Matrix
- ◆ Materials List

## **Current Availability of Curriculum Materials**

- ◆ All materials for Levels 1–6, 1st Edition, are currently available.

## **Impact Data Compiled to Date**

- ◆ *SIMMS Monograph 4: Assessment Report I*. A collection of articles summarizing research pertaining to SIMMS, available from the SIMMS Implementation Center
- ◆ *SIMMS Monograph 5: Assessment Report II*. A collection of articles summarizing research pertaining to SIMMS, available from the SIMMS Implementation Center.

## **Web Sites**

- ◆ At Simon & Schuster Custom Publishing: <http://www.simmsnet.com>
- ◆ At Montana State University-Bozeman: <http://www.montana.edu/wwwsimms>

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# ***Other Resources and Services available from the K–12 Mathematics Curriculum Center***

## **Print Materials**

- ◆ *Curriculum Connections* newsletter
- ◆ *Choosing a Standards-Based Mathematics Curriculum* guide to selection and implementation
- ◆ *Curriculum Perspectives* from teachers, administrators, and developers
- ◆ *Discussion Cases* to provoke reflection on a variety of issues
- ◆ A series of *Issues in Mathematics Education* papers
- ◆ Mathematics education and curriculum reform *Reader*

## **Seminars**

The K–12 MCC offers the following three seminars about selection and implementation, professional development, and building leadership for curricular change:

### **Considering New Curricula**

March '99 • April '99 • July '99 • September '99 • December '99 • March '00 • July '00

### **Making Your New Curriculum a Success for Teachers**

February '99 (pilot) • July '99 • February '00 • July '00

### **Building Support for Curricular Change**

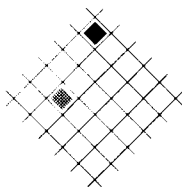
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## **For more information, contact:**

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**Everyday Mathematics (K-6)**

**Investigations in Number, Data and Space (K-5)**

**Math Trailblazers (TIMS) (K-5)**



**Connected Mathematics (6-8)**

**Mathematics in Context (5-8)**

**MathScape: Seeing and Thinking Mathematically (6-8)**

**MATHThematics (STEM) (6-8)**

**Middle-school Mathematics through Applications Project II (6-8)**



**Contemporary Mathematics in Context  
(Core-Plus Mathematics Project) (9-12)**

**Interactive Mathematics Program (IMP) (9-12)**

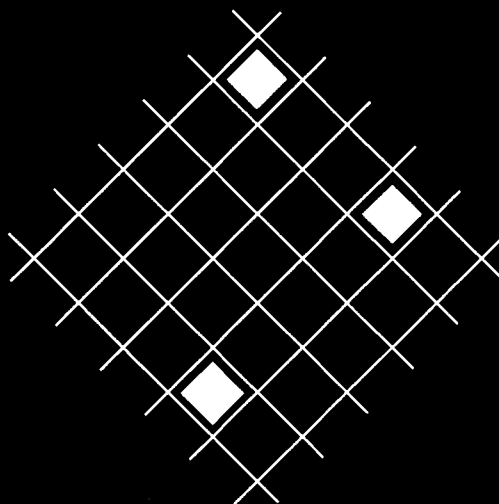
**MATH Connections:**

**A Secondary Mathematics Core Curriculum (9-11)**

**Mathematics: Modeling Our World (ARISE) (9-11)**

**SIMMS Integrated Mathematics:**

**A Modeling Approach Using Technology (9-12)**



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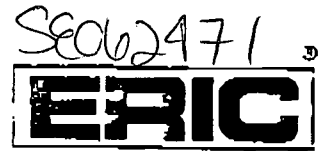
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